



FRD ACTIVITIES REPORT

January - March 2015



RESEARCH PROGRAMS

Project Sagebrush

Considerable progress has been made in preparing the comprehensive data report for Phase 1 of Project Sagebrush (PSB1) but it is still in the process of internal revision and editing. It will provide a detailed description covering all aspects of experimental design, instrumentation, measurements, quality control procedures, and the final database for the project.

A manuscript for journal publication tentatively titled 'Revisiting the value of the horizontal plume spread parameter σ_y : Part I' had been drafted that covered some of the key findings of PSB1. This paper was redrafted in light of some new analyses and renamed ('Revisiting the values of the horizontal plume spread parameters σ_θ and σ_y '). It is presently in internal FRD review. What was originally a companion paper to the original draft (Part II) is now in the process of being revised and will now stand alone. It will be a significant upgrade with the inclusion of several additional data sets and expand on some issues regarding the magnitude of σ_θ raised in the first paper. Tentatively, it has been found that the magnitudes of σ_y measured during PSB1 tend to be larger than those determined from earlier field studies and that the magnitudes of nighttime σ_θ are much larger than those presently utilized in many existing modeling schemes.

We are still assisting Bruce Hicks with analysis of the measurements gathered by FRD and WSU on the Grid 3 tall tower over the period of September, 2013 to November, 2014. The analyses also utilize complementary measurements from the INL mesonet including measurements from the radar wind profiler and sodar. WSU has now provided 30-minute averages for their data with other data sets pending. Most of the assistance to Bruce Hicks has come in the form of providing the requested data sets but some supporting analyses have been completed. He is presently focused on investigations related to the stable boundary layer. (Dennis.Finn@noaa.gov, Rick Eckman and staff)

Preparations for Project Sagebrush phase 2 are beginning. In March, some dryers for the Fast Response Tracer Analyzers were rebuilt for use this fall. Inventories of calibration standards and other supplies will be conducted in April so supplies may be ordered. A differential GPS survey of the entire grid is scheduled for April. Since phase 2 will focus on light winds, climatological data both from the NOAA/INL Mesonet and a sonic anemometer deployed near the tracer release site are being reviewed to provide a better understanding of the most likely wind directions and turbulence levels that can be expected under such conditions. This is important for determining the central direction and width of the sampling arcs that make best use of the available equipment. The investigation also revealed some interesting issues related to computing the standard deviation of the wind direction in light winds. These issues are being investigated further. (Roger.Carter@noaa.gov and Rick Eckman)

Big Southern Butte Study

The manuscript below has been accepted and published at Atmospheric Chemistry and Physics:

Butler, B. W., Wagenbrenner, N. S., Forthofer, J. M., Lamb, B. K., Shannon, K. S., Finn, D., Eckman, R. M., Clawson, K., Bradshaw, L., Sopko, P., Beard, S., Jimenez, D., Wold, C., and Vosburgh, M.: High resolution observations of the near-surface wind field over an isolated mountain and in a steep river canyon, Atmos. Chem. Phys. Discuss., 14, 16821-16863, doi:10.5194/acpd-14-16821-2014, 2014.

The Fire Lab group from the U.S. Forest Service led this research effort. FRD collaborated with their field study on Big Southern Butte, a large isolated peak rising from the Snake River Plain a short distance south of the INL. The high spatial and temporal resolution of the measurements in highly complex terrain is expected to provide a valuable database for the modeling of wildfire behavior.

(Dennis.Finn@noaa.gov)

Birch Creek Valley Wind Flow Study

The lead author of the paper by the U.S. Forest Service, described in the Big Southern Butte section, has informed us that they will now be freed up to proceed with the processing of their data sets from the collaborative Birch Creek Valley field measurements made in 2013. We have been awaiting the availability of their data to proceed beyond a preliminary analysis stage.

The manuscript 'Impacts of soil heat flux calculation methods on the surface energy balance closure' by Eric Russell, Heping Liu, Zhongming Gao, Dennis Finn, and Brian Lamb has been submitted to the journal Agricultural and Forest Meteorology. This paper stems from measurements made by WSU during the 2013 collaborative field program. (Dennis.Finn@noaa.gov)

Wind Forecast Improvement Project (WFIP)

FRD is moving ahead with its deployment plans for the second phase of WFIP, which is focusing on wind farms near the Columbia River on the Oregon-Washington border. Currently, it looks like most of the participants will not get their equipment into the field until around September. This is mostly due to the time required to get leases in place. FRD's profiling equipment, which includes three sodars and one 915 MHz radar profiler, is scheduled to be deployed at three locations: Boardman, OR; Wasco, OR; and Prineville, OR. The division is also bringing two surface-flux systems to the study. These include measurements of soil temperature and moisture, surface energy balance (including all four components of net radiation), and turbulence. There is still some debate on where these flux systems should be deployed. The region with wind farms is covered with a patchwork of fallow and wheat fields, so one option is to place one system in a fallow field and the other in a wheat field. (Kirk.Clawson@noaa.gov and Rick Eckman)

ARL Convective Initiation Project

Dr. Michael Buban has been hired as postdoctoral associate to replace for Dr. Shuyan Liu, who left the project in December. He recently completed his Ph. D. at the University of Oklahoma while working with Dr. Conrad Ziegler at the National Severe Storms Laboratory. His thesis work is related to the development of vortices along boundaries such as drylines and fronts, and their role in convective initiation. This work is closely related to the goals of the ARL Convective Initiation project. Dr. Buban starts work at ATDD in Oak Ridge, Tennessee on 1 April. Due to the project's time constraints and focus

on convection in the Southeast, the staff at FRD and ATDD decided that Oak Ridge would be a more suitable office location for Dr. Buban. However, both divisions will be involved in the supervision of his activities. (Richard.Eckman@noaa.gov)

HYRad

A prototype user interface for creating multiple simultaneous source releases for HYRad has been developed and is currently in beta testing. The key development steps involved appropriate configuration of the CONTROL and EMITIMEs files that are necessary to implement the multiple source scenarios. Considerable work was also required to optimize the user interface. The realization of multiple source modeling made the potential for a much larger number of isotopes a concern with respect to long model run times. A scheme was devised to classify the isotopes by location, deposition characteristics, and half life and then to represent each class by proxy isotopes. The proxy isotopes are processed in HYSPLIT instead of each individual isotope and the HYSPLIT output is then reprocessed to restore the actual contribution by each real isotope. This pares the number of particles that HYSPLIT must process and often offers significant time savings. (Brad.Reese@noaa.gov, D. Finn)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

NOAA/INL Mesonet

January brought cold temperatures and the usual radio frequency interference to the VHF radio telemetry network used to collect data from the NOAA/INL mesonet. We were able to avoid most of the problems by switching to the remote RF base station located on the INL site. Unfortunately, the telephone line connecting the FRD office to the remote RF base station went down over one weekend leaving a couple of days of data holes that had to be filled. The Campbell Scientific CR23X data loggers have a problem with collecting large data holes. They go into a mode where they cannot complete any hole collections and must be manually rebooted to correct the problem. Consequently, we spent a couple weeks working with the RF network and rebooting data loggers before all the data could be recovered. An automatic CR23X reboot mechanism is being tested in an effort to reduce this problem in the future.

The CR23X data loggers used on the NOAA/INL mesonet stations are aging. They were installed in 2004. We would like to replace them in the next couple of years. We are currently evaluating available data loggers and communication options. We have purchased four data loggers for evaluation: two from Campbell Scientific, one from Thermo Fisher Scientific, and one from Coastal Environmental. We hope to be able to run these data loggers for several months to a year to see how they perform. We have also identified several companies that can provide VHF communications at much higher speeds than the Campbell Scientific system we currently use. The goal is to develop a plan for a complete network upgrade over the next year. (Roger.Carter@noaa.gov , Shane Beard, Tom Strong)

Meteorological data from the NOAA/INL mesonet are uploaded to NOAA MADIS every five minutes. Unfortunately, we have identified a number of problems with the data upload and are working with the MADIS staff to resolve them. Last quarter, the problem with data being inserted in the MADIS database at incorrect times was reported here. The investigation into this problem is continuing. There is also a problem with uploading data that was missed in the initial every five minute upload. MADIS is implementing a fix for this problem later this month. In late March, a problem ingesting the uploaded data into the MADIS database developed. Currently, 30-50% of the INL data that are successfully

uploaded to the MADIS computers are not showing up in the MADIS database. This problem is still being investigated. Hopefully, these problems will be resolved soon. (Roger.Carter@noaa.gov)

Emergency Operations Center (EOC)

Kirk Clawson as a member of the Emergency Response Organization Team B participated in the first EOC drill of the year on 17 March. The scenario centered on a sodium fire that occurred during a forklift accident at the Materials and Fuels Complex (MFC). Real-time weather was used for the drill. Since there was no radioactive release, dispersion modeling was not required. Nowcasts and short-term forecasts were provided to help with a simulated evacuation of the facility by bus.

A request was received for special data files (a.k.a. canned weather) for an emergency response drill scheduled for July 2015. An initial set of files were created and made available for the requester to review. (Roger.Carter@noaa.gov)

INL Hazardous Weather Alert System

The jet stream stayed mainly to the north and east keeping mild weather across Idaho and much of the Western United States last quarter. As a result only one hazardous weather statement for high winds was issued.

OTHER ACTIVITIES

Safety

Roger Carter presented a cylinder safety video during our staff meeting in January.

Staff viewed a fire safety video during February staff meeting.

At the March staff meeting, employees listened to a recorded bomb threat. We discussed what to listen for when a bomb threat is received, questions to ask the caller, and we reviewed the bomb threat checklist.

Training

Donna Davis participated in the Annual Inventory Procedures webinar on January 14.

Donna Davis completed the Fssi-Os3 Acquisition Seminar on January 21.

All employees and contractors completed INL's Annual Security Refresher course.

Ann Kelsey with DOE Retirement/Benefits met with our staff on March 19 for a brief pre-retirement training session. We have scheduled a two day pre-retirement seminar in May for more in-depth training.

Travel

Kirk Clawson and Rick Eckman attended and gave presentations at the 95th AMS Annual Meeting in Phoenix Arizona January 4-8. Kirk Clawson's presentation was "Dispersion Characteristics of Project

Sagebrush Phase 1.” Rick Eckman’s presentation was “Changes in Horizontal Plume Distributions at Larger Turbulence Intensities.”

Kirk Clawson traveled to various sites in Washington and Oregon area January 19 – 22 in preparation for the WFIP2 Project.

Jason Rich and Kirk Clawson attended the 12th Annual National Weather Service Spring Flood Outlook & Ground Hog Day Chili Cook-Off at the Pocatello Weather Forecast Office in Pocatello, ID on January 30, 2015.

Outreach

Jason Rich answered an “Ask-a-Scientist” question for the Post Registrar about how much warmer February temperatures were compared to average air temperatures.

Miscellaneous

Dennis Finn was presented with his 10 year Service Award on March 13.